REVOLVING LOAN FUND DESIGN WORKSHOP

INTRODUCTION

The Fund Design Workshop described in this report was implemented by the International Institute for Energy Conservation (CERF/IIEC) in partnership with, and under sub-contract to Advanced Engineering Associates International (AEAI), and with the assistance of KPMG Armenia. These activities were undertaken as part of the Energy Efficiency, Demand-Side Management and Renewable Energy Resources Project being implemented by AEAI under contract to USAID (LAG-I-00-98-00004-00, Task Order 816).

The purpose of the workshop, which took place in Yerevan on 6 June 2002, was to inform the process of designing a revolving fund or other mechanism for supporting energy efficiency projects in Armenia. The design of the fund should aim to incorporate the following characteristics:

- its interventions should be optimised so that it can maximise the total number of projects that it enables to take place.
- it should act in such a way as to promote the involvement of the local banking sector in financing energy efficiency projects.
- it should earn a rate of return that allows the total size of the fund to be sustained over time.

It is worth noting that the scope of the revolving fund, and therefore of the workshop, is limited to certain sectors. Specifically, the industrial, transportation and energy supply sectors fell outside the remit of this activity and were therefore not considered.

WORKSHOP AIMS AND STRUCTURE

The aim of the Fund Design Workshop was to create a forum within which a relatively small number of key stakeholders could discuss the detailed aspects of the design of an energy efficiency revolving fund. These discussions would be guided by the use of:

- realistic data on project costs and revenues based, where possible, on project proposals that had been received by AEAI.
- a simple spreadsheet model that allows the user to experiment with a range of different project structures and parameters.

The workshop was structured so as to provide the greatest possible opportunity for detailed and constructive discussions. The number of plenary presentations was kept to a minimum, with most of the day devoted to breakout sessions, each with the brief of studying a particular category of project. In particular, it was hoped that, for each type of project, the workshop would yield answers to the following questions:

- what is the optimum relationship between project players (client, bank, ESCO, fund) to ensure that the project will succeed?
- by what mechanism should the fund make finance available to the project (on-lending through the bank, partial risk guarantee, equity investment etc.)?
- is it possible for the fund to reduce the cost of capital sufficiently to have a significant impact on the bankability of projects, while still earning a sufficiently high rate of return to sustain itself?

Workshop participants were selected to ensure that each breakout group was made up of individuals with a particular interest or expertise in the relevant type of project. The aim was to ensure that each group included:

- an ESCO representative, preferably one who has proposed a project of the type being considered
- a representative of the financial sector
- a member of the client group for the type of project under consideration

The agenda for the workshop and a list of participants are presented in Appendices 1 and 2.

SUMMARY OF BREAKOUT SESSIONS

Most of the workshop time was allocated to four breakout group discussions, each of which revolved around a particular type of energy efficiency project. Full notes from each of the breakout sessions are presented in Appendices 3-6. The following is a short summary of the main points arising from each group.

Breakout Group #1 based their discussions around a heating system replacement / refurbshment project in the residential sector. Discussion about the ratio between system cost and annual net revenues concluded that 7:1 or even 8:1 is more realistic than the 5:1 that had been assumed in the original version of the model. This ratio, which is approximately equivalent to the simple payback period, is largely determined by the ability and willingness of households to pay for heat. Once this starting point had been established, the remainder of the discussion revolved around the feasibility of different project structures. The main conclusions were as follows:

- Significant cost-sharing by clients and / or the ESCO is essential if this type of project is to be bankable.
- If bank could be shielded from all risks through a guarantee, bank loans of about 18% over three years would be possible.
- The main goals of the fund should be to stimulate the formation and survival of ESCOs and to prevent project failures.
- The fund must have its own panel of experts for project evaluation.
- The fund should not give grants to ESCOs, but should concentrate on making low-interest loans or equity investments.
- The possibility should be investigated of creating a small project company that would effectively be a joint-venture between the ESCO, the client(s) and the fund.
- For a project of this sort to be affordable, the overall cost of money must be no greater than about 8%.

Residential heating projects using individual gas heaters in apartments were the basis for discussions in **Breakout Group #2**. Discussions commenced by examining the 2001 PA Consulting study on providing a gas supply and individual gas heaters to apartments. There was no agreement on whether this type of project is viable, with doubts expressed over whether the gas utility has the resources or the incentive to play an active role. Further discussions on detailed aspects of loan fund design were therefore restricted to more general energy efficiency investments rather than specific types of project. The following is a summary of the group's conclusions:

- Banks in Armenia cannot operate in a 'normal' manner, primarily because the current legal situation provides poor protection for banks.

- In order for projects to be bankable while still allowing the USAID fund to revolve, simple payback periods need to be no longer than 3-4 years.
- The USAID fund should aim to extend loan terms to beyond five years, reduce interest rates to less than 18% and reduce collateral requirements to less than 100% of the loan amount.
- The fund should not attempt to bring about banking sector reform as its primary aim
- If the fund is to provide a guarantee, the cost of this guarantee must be less than the current risk premium as assessed by the market
- In many cases, certain components of a project may yield non-cash benefits. For the overall project to remain bankable, it is necessary for these components to be funded by the owner of the facility.
- The involvement of ESCOs is constrained by limited financial resources, limited management experience and weaknesses in contract law.

In **Breakout Group #3**, municipality energy efficiency projects in the areas of streetlighting and water pumping were examined. In fact, since there was no representative from the water utility present, the discussion focused mainly on streetlighting. Most streetlights currently in use are fitted with mercury lamps, and considerable energy savings could be achieved by replacing these with sodium lamps. It is estimated that the payback period for this type of relamping project would be in the region of 6 to 7 years.

The following is a summary of the conclusions from this group:

- There are likely to be problems with a state-owned enterprise such as the Yerevan Streetlighting Company borrowing money from a commercial bank to implement efficiency upgrades.
- The participation of an ESCO would overcome this difficulty, but to be practical, this would require the operation and management of streetlighting to be handed over to the ESCO for a period of several years. If this is done on a wide scale, the streetlighting company itself becomes more or less redundant. However, given that the streetlighting company will soon be privatized, the newly-privatized company could tender for the streetlighting contract alongside other ESCOs.
- It is essential to ensure that a legally water-tight contract can be drawn up between the municipality and the ESCO.
- It was recommended that project models are tried out initially on a small scale. For example, an ESCO could be granted the responsibility to provide lighting for two streets.
- ESCOs expresed a willingness to cost share to the tune of up to 20%, but the municipality itself should also contribute a share.
- The possibility of cost-sharing from other parties should also be investigated, for example local businesses, condominiums etc.

Discussions in **Breakout Group #4** focused on heating system upgrade projects in schools and hospitals. Unfortunately, no representative from the local financial sector was available to participate in this group. The group used data from projects at School #132 and School #21 to guide their discussions.

The condition of heating systems in many schools and hospitals has reached a critical level, and there is an urgent need for improvements. Unfortunately, financial resources are tightly constrained, particularly in the case of ordinary secondary

schools where pupil numbers are falling (budget allocations are calculated on the basis of the number of pupils).

Because schools and hospitals are generally not adequately heated at present, projects to improve heating systems yield only limited cash savings. Instead, most of the benefits are in the form of improved comfort. Unfortunately, the project beneficiaries have only limited capacity to contribute towards the project costs. As a result, payback periods for this category of project tend to be very long.

The main conclusions drawn from this group were as follows:

- Schools have no assets that can be pledged as collateral to back a loan. If the USAID fund provided a guarantee, this might make borrowing possible, but it would not significantly soften the loan terms on offer from the local banks.
- It is very difficult to achieve a simple payback period shorter than about 10 years for this type of heating project, and if all the costs are included (gas pipeline extension, full weatherization etc.) the figure is closer to 20 years.
- Even if only a small portion of the project costs are financed with a loan from a local bank, the debt service repayments exceed the likely annual project benefits.
- It is possible that up to 5% of the cost of a school heating project could be raised from the parents of the pupils. If the USAID fund is to receive a sufficiently high return to allow it to 'revolve', the cost-share component needs to exceed 20% of the overall project cost. Many projects in this category therefore require a significant grant component from elsewhere (e.g. the diaspora community) in order to be viable.

CONCLUSIONS

The workshop discussions provided some valuable insights into the criteria that an energy efficiency revolving fund needs to meet in order to be effective. Of particular significance was the extent of the gap that exists between the current cost of capital in Armenia and the cost of capital that is affordable by the types of energy efficiency projects considered. It is this gap that the fund needs to be able to bridge.

Workshop discussions revealed that the affordable cost of capital for energy efficiency projects ranges from about 10-11% in the case of streetlighting projects to 8% for many residential heating systems, down to almost zero for projects in schools and in low-income households. These latter types of project generate benefits that far outweigh the costs, but they are generally non-cash benefits. As a result, the project has a limited ability to generate a cash-flow that could be used to service a loan.

Energy efficiency projects in schools and in low-income households generally become bankable only if there is a sizeable injection of grant funding. This might take the form of grants from donor organizations, or it may be made up of cost-share contributions from project beneficiaries. As a general principle, where there are significant non-cash benefits from a project, the beneficiaries of these non-cash benefits should, where possible, contribute a commensurate fraction of the project costs with no expectation of a financial return. This in itself has the effect of bringing down the overall cost of capital, since those making a cost-share contribution are effectively providing capital at zero cost.

In the case of both schools and residential sector projects, workshop participants indicated that as much as 5% of the project cost could be covered by cost-share contributions from the project beneficiaries (residents, and parents of pupils respectively). However, workshop findings indicated that some school projects would need up to 20% cost-share to become bankable. Clearly this level of cost-sharing implies the significant involvement of donors.

Most of the projects studied in the workshop can afford an overall cost of capital in the range of 8-11%, which is much lower than the current interest rate charged by local banks. One mechanism through which the fund could reduce the cost of capital is by providing a partial risk guarantee. However it was found that, on its own, a guarantee has relatively little impact in reducing the cost of capital, for the simple reason that the current cost of capital does not contain a high risk premium. At best, a guarantee fund would bring down the cost of capital to 18%, with loans available for a maximum of three years. Despite this, some form of guarantee is undoubtedly desirable in order to provide the banks with the security they need to offer loans in situations where physical collateral is unavailable.

In order to bring the overall cost of capital down to affordable levels, only a portion of the project cost can be financed though a loan from a local bank, with the balance being provided by the fund though one of several possible mechanisms. However, whatever mechanism is chosen, one important conclusion that can be drawn is that, if the fund is to have a significant impact without rapidly becoming depleted, it needs to be much larger than $1 million in size. At this size, the administrative costs are likely to be so high that the fund would need to earn a rate of return of about 16% simply to sustain itself. This is clearly untenable, given that the projects the fund aims to support can only afford a cost of capital of, at best, about 8-11%. The fund therefore needs to be expanded to such a size that its annual administrative costs fall to no more than about 4-5%.

In almost all of the cases studied in the workshop, the involvement of an ESCO was felt to be necessary. At the very least, the ESCO would be the main implementing agents, responsible for the detailed engineering design, construction and, in some cases, operation of the project. However, most workshop participants envisaged a deeper role for ESCOs that would involve them as recipients of loans. In most cases, loans cannot be made directly to the energy end-users, either because they have no credit history, because they do not have the legal authority, or because they are too numerous and diverse. In these cases, the involvement of an ESCO as an financial intermediary enhances the likelihood of devising a workable project structure.

The fund should attempt to address the obstacles that currently prevent ESCOs from fulfilling this role. The most important of these obstacles is that ESCOs generally have insufficient assets of their own that enable them to borrow commercially. It is doubtful whether contract law in Armenia is sufficiently robust to allow a contract between an ESCO and its client to serve as collateral for a loan from a local bank[1]. The fund can overcome this barrier by one of two ways, or indeed by a combination of both. Firstly, the fund could make loans directly to the ESCOs, either directly or on-lent through a local bank, but without the security offered by collateral. Clearly some measure of risk sharing between the fund and the ESCO would be necessary if unsecured loans are to be made. This would take the form of an equity investment by the ESCO that would be forfeit if the project failed.

Secondly, the fund could make an equity investment in an ESCO, capitalizing it to the extent that it is able to implement the bulk of the project from these resources, borrow the balance commercially. The advantage of equity investments from the fund is that they permit a degree of flexibility in the flow of repayments from the ESCO. The

[1] Regardless of whether a contract between an ESCO and its client could serve as security for a bank loan, perceived and actual weaknesses in contract law may in any case result in ESCOs being exposed to untenable levels of risk. For example, an ESCO that has an obligation to service a loan needs to have a water-tight and enforceable contract with its client, to ensure that it will receive the due payments in full and on time. It is by no means certain whether the current legal environment in Armenia would permit this.

ESCO is therefore better able to service its debt under circumstances where project revenues may be uncertain and fluctuating.

A variant on this project structure that was favoured by some workshop participants, and which should be explored further, involves the creation of a project company jointly owned and capitalized by the fund, the clients and the ESCO. Under this approach, the project company would borrow a portion of the project cost from a local bank, with its assets serving as collateral. In the case of a heating project, these assets would be the removable components of the system. This is a form of limited recourse financing, under which it is only the assets of the project company itself that are at risk if the project fails.

LIST OF PARTICIPANTS

NAME	ORGANIZATION	GROUP
ABRAHAMYAN Mara	World Bank	4
ASTVATSATRYAN Alexander	World Bank	1
BABAJIANYAN Vahan		2
BALABANYAN Ani		3
BAREYAN Samvel	KPMG	4
DEWEY Bosworth	IIEC	2
GALSTYAN Karen	Yerevan Streetlighting Co.	3
GEVORGYAN Ashot		1
GHARIBYAN Aram		2
GHAVALYAN Liana	Ministry of Health	4
GOMPTSYAN Ashot	Ministry of Finance	4
GOMTSYAN Ashot		3
GRIGORYAN Asatur	SouthTherm	1
HARUTIUNYAN Andranik		1
HARUTIUNYAN Ashot		2
HARUTIUNYAN Diana		1
HATSAGORTSYAN Armen	Siemens	1
HOUSEHAM Ian	IIEC	1
HOVANISYAN Hovakim		4
HOVNANNISYAN Armen		1
KATINYAN Vaduhi	#5 School Director	4
KERYAN Edik		2
KHARAZYAN Robert		1
KHAZANCHYAN Albert		2
KHAZARYAN Hamlet	#2 School Director	4
KHEBOYAN Vaduhi	#8 School Director	4
KOCHARYAN Ara	Cesco	4
KOCHARYAN Levon	Cesco	3
LALAYAN Arthur	Solaren	4
MANUKYAN Khachatur	Armenian Development Bank	4
MARTIROSYAN Artashes	Inecobank	3
MELIKYAN Vahe	AEAI	3
MELIKYAN Zohrab	Association of Energy Engineers	1
MINASYAN Sahak	VN	3
OHANYAN Razmik		2
PETROSYAN Ara		1
PETROSYAN Artashes	ESCO Microclima	3
TER_GRIGORYAN Ruben		1
TSOVYAN Robert		4
VANOYAN Mayis	Urban Institute	3
VARDANYAN Artak	USAID	
VARDANYAN Levon		3
VATYAN Arman	KPMG	3
WORZALA Mary	AEAI	3
YEGHOYAN Leyla	Yerevan Municipality Dept. of Education	4

Energy Efficiency, Demand Side Management and Renewable Energy Resources Program

ENERGY EFFICIENCY PROJECT DESIGN WORKSHOP

6 JUNE 2002

Sponsored by USAID through AEAI and IIEC

A G E N D A

09:30 – 10:00	Welcome and Introductions
10:00 – 10:15	Purpose and Schedule of Workshop (Ian Household – IIEC)
10:15 – 11:00	The Energy Efficiency Revolving Fund – introduction to the concept, and proposed mode of operation (Bos Dewey, Ian Household – IIEC)
11:00 – 13:00	Working Group Breakout Sessions
	Group 1: residential heating system and weatherization
	Group 2: residential individual heaters and weatherization
	Group 3: municipal streetlighting / water pumping efficiency upgrade
	Group 4: school / hospital heating system and weatherization
13:00 – 14:00	LUNCH
14:00 – 15:30	Working group breakout sessions (contd.)
15:30 – 16:30	Presentation of findings of working groups
16:30 – 17:00	Discussions and next steps (Mary Worzala – AEAI)

NOTES FROM BREAKOUT GROUP 1

Subject:
Revolving fund components for funding residential sector building heating system refurbishment / replacement

Present:
Ian Househam (facilitator), Ruben Ter-Grigoryan, Robert Kharazyan, Ara Petrosyan, Armen Hovnannisyan, Diana Harutiunyan, Alexander Astvatsatryan, Asatur Grigoryan, Ashot Gevorgyan, Armen Hatsagortsyan, Andranik Harutiunyan, Zohrab Melikyan

As a beginning to the discussion, the group aimed to reach a consensus on a realistic set of numbers to feed in the the illustrative spreadsheet model. Because of constraints on the willingness and ability to pay for heat on the part of householders, it was felt that the ratio between the initial cost of the heating system and the amount that could be earned annually from heat sales certainly should not be below about 7:1, and that a ratio of 8:1 was more realistic. Note that this ratio is effectively the simple payback period (in years) of the project.

This estimate was based on two assumptions:

- that households are used to paying approximately $20 per Gcal for heat, and although some might be willing to pay slightly more for a superior quality of heat supply, most would be unwilling, and a significant fraction would be unable.
- that a heating system of 1.2 MW capacity would cost about $72,000 to install

[NOTE 1 – later in the session, several participants stated that a heating system of 1.2 MW would supply about 1,000 Gcal of heat per season. This seems reasonable, as it is consistent with operating for 10.7 hours per day for a 90-day heating season. If residents are willing and able to pay $20 per Gcal, the annual heat sales would be $20,000. Assuming annual operating costs (fuel, maintenance, bill collection etc.) account for about half of the heat sales, this is consistent with a simple payback period of 7 to 8 years that participants had stated previously. However, these figures need to be checked thoroughly to arrive at a more robust estimate of simple payback period.]

[NOTE 2 – at another point in the session, participants stated that electricity tariffs are currently AMD15 per kWh at night, and AMD25 per kWh during the day. These figures correspond to about $40 per Gcal (the exact figure depends on the balance between day and night consumption) which is inconsistent with the figure of $20 per Gcal stated before.]

The opinion was expressed by some that an economically viable project would only be possible if it included the sale of hot water as well as space heat. It was pointed out that, if the estimate of annual revenues was assumed to include sales of hot water, the simple payback period would be somewhat shorter.

Bank representatives expressd the view that the major component of interest rates at present is the opportunity cost of capital. As a consequence, the existence of a cast-iron guarantee would not have the effect of bringing down interest rates significantly. They felt that loans of 18% over three years would be possible in the presence of a high guarantee, compared with 20% over two years under present conditions.

Participants then spent some time experimenting with the spreadsheet model, the outcome of which was a realization that, assuming a simple payback period of 7-8 years, it is extremely difficult to structure this type of project in such a way as to provide all project players with an acceptable rateof return. For example, even if the project was funded entirely from the USAID fund at 10% interest over 10 years, the

annual loan repayments would still need to be approximately 15% higher than the likely annual project revenues. A number of solutions were found that would ensure repayment of the bank loan, but these generally involved a very low rate of return to the fund, resulting in its rapid depletion.

It was therefore considered essential that some up-front contribution to the project cost is made by either the clients (i.e. the householders) or the ESCO. It was felt by some that obtaining an up-front contribution of $150 per household was not unrealistic, although others were sceptical. There was doubt as to whether ESCOs would have available cash to invest in projects, although an in-kind contribution was thought to be feasible.

There was some interest in the idea that a project company should be created, consisting of all the interested parties, including the donor organizations, who would all contribute an equity share in the project.

It was suggested that there should be a distinction between the project components that are unmovable and those that can be removed. While the latter could be pledged as collateral (or leased, if the legal environment for leasing were suitable), the non-movable components could not be. The USAID fund plus any cost-share contributions from project participants should be used to purchase the non-movable components, while a bank loan could be used for the removable items.

The view was also expressed that it is essential for the ESCO to have some financial interest in the project, so that they have some incentive to ensure its satisfactory performance. However, it was agreed that the ESCO should not be held accountable for aspects of project performance over which it has no control. So, while the ESCO should carry the risk associated with inadequate maintenance and poor bill collection, it should be protected against risk due to adverse energy price movements and *force majeure*. But of course, the ESCOs need to get a return on their investment that is in keeping with the level of risk they are carrying. Some participants expressed the view that, if the ESCOs are expected to carry all the risks and the banks are essentially 100% protected from any risks, then projects would be unlikely to move forward.

It is worth recording that some participants were sceptical as to the value of including local banks as project players. The view was expressed that, for the first five years at least, the involvement of banks should not be sought as they are not yet in a strong enough position to be able to enhance the likelihood of success. In response to this, it was pointed out that, while the USAID fund certainly should not have as its primary aim the transformation of the financial sector, it should also avoid competing with or undermining local banks. There is a danger that if the fund promotes projects with absolutely no local bank involvement, this would actually reduce the likelihood that future energy efficiency projects could succeed without the involvement of donor assistance.

As a final caveat, some participants highlighted the comparative weakness of contract law in Armenia at present.

Conclusions:

- Significant cost-sharing by clients and / or the ESCO is essential if this type of project is to be bankable.
- If bank could be shielded from all risks through a guarantee, bank loans of about 18% over three years would be possible.
- The main goals of the fund should be to stimulate the formation and survival of ESCOs and to prevent project failures.
- The fund must have its own panel of experts for project evaluation.

- The fund should not give grants to ESCOs, but should concentrate on making low-interest loans or equity investments.
- The possibility should be investigated of creating a small project company that would effectively be a joint-venture between the ESCO, the client(s) and the fund.
- For a project of this sort to be affordable, the overall cost of money must be no greater than about 8%

NOTES FROM BREAKOUT GROUP 2

Subject:
Revolving fund components for funding gas distribtution for residential heating

Present:
Bosworth Dewey (facilitator), Edik Keryan, Albert Khazanchyan, Vahan Babajianyan, Ashot Harutiunyan, Aram Gharibyan, Razmik Ohanyan

As a starting point to our session on the uses of the revolving fund, the group started by discussing the study undertaken by PA Consulting on the gas distribution demonstration project undertaken in 2001. In that study, PA Consulting, in collaboration with Yerevangaz and a local contractor, provided gas supply and appliances to 143 apartments and houses in Yerevan. As part of the demonstration, they also provided the customers with US-made heaters. The results of the first year were somewhat inconclusive as the program implementation was delayed and only overlapped with the tail end of the winter heating season. A second review, completed in Spring of 2002, provided more detailed analysis of the savings and the costs.

The group had many questions about the program and its implementation and its findings. There did not seem to be consensus on the viability of this type of program, although most agreed that if it could be designed properly, it could be successful. The problem is that the gas distribution is a monopoly and there is currently no incentive for the gas suppliers to be any more active or proactive in this kind of process. The general consensus on the gas distribution was that implementation was more restricted by the resources of the gas utility. The conversation bogged down along these lines and a decision was made to downplay the details of this project and instead to focus on the potential for a revolving fund to support efficiency projects in general. In order to do this, we needed to understand a bit better the potential impacts that a fund could have on the cost of, and access to, financing for energy efficiency projects. Therefore, this discussion and the subsequent ones did not use the gas distribution model, but were more generic in their conclusions.

The second part of the program focused on the use of the data as inputs for the model that Ian Household of IIEC and Mike Boyd of USAID had put together for this workshop. The assembled group were shown different iterations of the model and the outcomes of various scenarios. The use of the model allowed them to see how the various factors – ESCO contract period, equity contribution by ESCO or homeowner, loan terms and tenors, and the value and cost of the revolving fund – interacted and changed the resulting returns. This was important because it is critical that the fund meet the financing needs of the parties to the efficiency projects but also remain cash neutral throughout its life.

There was also a discussion of the ways that the revolving fund would interact with the lending process in ways that could not be captured in the model, such as reducing collateral requirements. It became clear that the operation of banks in Armenia are quite a bit different from those in more developed (financial) markets. Banks in Armenia do not undertake the normal credit analysis or project analysis as part of their due diligence process. Instead they rely mostly on the value of the collateral that is offered by the borrower to secure the loan. This is more like the operation of a “pawn shop” than a normal risk taking banking operation. The reasons are understandable as the legal system is still inadequate to protect the bank from defaults or forfeitures, so the only safe security is the asset which is placed into the hands of the bank. What became clear from this discussion is that while interest rates and loan periods are barriers, the bigger obstacle is this issue of collateral and

the lack of credible guarantee for repayment. It is this aspect which a risk equity loan fund may have to attack.

In the last part, the group held a discussion of the various barriers to third party financing of energy efficiency investments. In this discussion, the group identified the barriers to efficient financing, from the perspective of the various parties in the relationship – Client, ESCO and Bank. The group then reviewed options for reducing or managing these risks, and ended by looking at the potential role for the revolving fund in financing efficiency projects.

Discussion Details:

Analysis of Financial Model and Impact of Various Scenarios on loan terms and fund viability: The Group evaluated the Gas Distribution project and the numbers that it generated under various scenarios – interest rates, loan terms, equity contributions, fund parameters. As project returns became more attractive, the funds viability eroded, in most cases. What became clear was that until lending terms became more attractive (see next discussion), the projects were simply going to have to have paybacks that were more aggressive. In other words, projects with simple paybacks (project cost/project return over period, ignoring finance costs) of less than 3-4 years were not likely to work. Projects under consideration were looking at had payback periods of 8-15 years and these simply were not sustainable or attractive. This argued for project evaluation screening that looked initially for "low hanging fruit".

Fund Impact on bank lending practices: In reviewing the value of the fund, we discussed the potential for the fund to impact current lending practices, both conceptually and practically. For example, the hope is that the fund would:

- Extend loan terms from the current 2 years to up to 5 years in order to better match the potential contract periods of the energy saving contracts and to reduce the burden of debt service on the projects.
- Lower interest rates from the prevailing 22%-25% for smaller borrowers to around 18% or lower
- To reduce the security/collateral requirements from the current 200%-300% of loan value to less than 100%.

Practically speaking, there was a recognition, however, that the role of the fund is not to be a catalyst for banking sector reform. The fund must either work within the current banking system, even as it reforms, or alternatively must work along side of it. There is simply not enough money in this programmatically to engage in broad based changes of lending behaviour. Given this state of affairs, it was recognized that the fund might have to operate outside the confines of the banking system, but work in collaboration with it as a co-funding partner in efficiency projects. It is hoped that by tailoring the fund as a co-financing vehicle, the banks themselves would see the projects in a new risk light and modify their terms to take advantage of the opportunities.

As one operating principle, it was determined that the cost of the guarantee or the premium which the fund manager would have to assess to cover administrative costs and bad debts (loan losses) would have to be less than the cost of the risk premium being assessed by the market. This may seem obvious, but it means that this calculation must be made and decisions made about whether the fund can in fact do this. For example, if the cost of administration is 15% (due to the smaller fund size) and the risk premium is 10%, then this 25% cost of money, assuming that the cost of funds for the AID Grant is 0%, still may exceed the local market. If this is the case, then the fund may have to operate in some other manner that keeps it sustainable while meeting market demand.

Barriers to Efficiency Finance – Risks from each party in the relationship: There was a discussion of the basic ESCO finance model, with the relationship between the client/project, the ESCO and the Bank spelled out. We also discussed the roles of others might play around this triangle, such as the utilities, the government, other donors, engineers and the Fund under discussion. It was decided that in order to determine the most effective intervention by the Fund, we needed to better understand the barriers each party encountered within a lending process.

Client Barriers/Risks:

- Low credit. Few individuals have the credit history with banks to be able to borrow on acceptable terms;
- Low capacity to pay up front. There is a limitation on cash on hand to make the equity contributions to projects which is required not only for sustainability, but also for "buy-in". This problem may not be so insurmountable in reality, as seen by the 40,000 in cash which local residents easily paid up front for the gas distribution project;
- Low capacity to pay over time. This relates to poor credit, but is more closely tied to low incomes and competition for available funds from other needs (food, school fees, rent, etc). There is also not a tremendous history of debt service and accountability, according to the members of the discussion group.
- Poor condition of Buildings or other infrastructure. There is a sense that some of these interventions and the results there from would have to take into account the other costs (heating efficiency would be balanced against weatherization losses.) In many cases adding these external costs to a project make them uneconomical from the perspective of the ESCO. Unless the property owner is willing to fund these improvements, the return on ESCO investments are undermined.
- Low understanding of energy efficiency (poor public awareness of value): There is a general lack of understanding of the principles of energy efficiency and the values of investments in these improvements. Additionally, there is a lack of awareness about the potential for financing them through savings, i.e., that efficiency project "pay for themselves".

ESCO Barriers/Risks:

- Limited financial resources. This reflects a general inability to provide equity to a given project. This effects their ability to guide the process and to "make the sale" in some cases. It limits their ability to act as much more than an engineering group or a financial aggragator or advisor.
- Limited credit capacity: This reduces their ability to source financing from third parties on their own behalf. To the extent that they do seek third party financing, it will be on the basis of the savings contracts and the credit of the client, rather than their own balance sheets.
- Poor asset base: These assets can be in the form of ongoing contracts or physical assets that can provide security to a project loan. This impacts both on points one and two above.
- Limited management capacity: While there is adequate engineering capacity within the "ESCO" field, there is a limited amount of management and financing experience. This will limit their ability to provide a more comprehensive service to the client unless this capacity is increased, both through education and through project experience.
- Poor Legal/Contract environment: The viability of the ESCO involvement in a project over time is predicated on its ability to secure a contract, to maintain it, and ultimately to enforce it if required. In an uncertain or onerous legal

environment, no ESCO is going to assume performance risks or payment risks from a client without some very binding collateral guarantees.

Bank Barriers/Risks:

This risk area was broken down by the participants into two perspectives – that of the Bank towards the borrowers, and by the borrowers towards the banks. This is important for our discussions, because if some of these "non-financial" barriers cannot be overcome with a fund, then it argues for an institutional framework outside the bank system – a Non-bank financial institution

Client Perspective:

- High interest rates
- High collateral/security requirements
- Short loan terms
- Poor understanding of energy efficiency project analysis
- Low motivation to serve new market and slowness of bureaucracy

Bank Perspective:

- Capital Adequacy Ratios are high. These ratios reduce the leverage gains banks can make by increasing the amount of funds they must set aside to protect against each loan.
- Low number of solid, creditworthy clients – low confidence in new customers. This problem is reflected in the fact that banks are not aggressive in seeking out new business opportunities and are happy to pursue limited opportunities with known clients, or more often to simply trade government bonds as the basis of their revenues.
- Low capital/financial base. Many of the banks are very small by western standards and have limited funds to disperse. This also limits their interest in new business opportunities.
- Poor legal/judicial environment. As noted above for the ESCO's, banks are very reluctant to lend without onerous collateral primarily because the legal environment does not support the lender. The laws around bankruptcy and forfeiture are poorly constructed and enforced, forcing banks to spend years in court at which time the asset value is negligeable.

Function of the Fund: There are several potential roles for the fund to play and each of them has its benefits and their costs.

Co-financing vehicle. Under this scenario, banks become the management proxies for the fund and act as on-lenders. Funds are blended with bank lending and because the cost of the fund capital is lower, it is reflected in a lower cost of borrowing to the customer. The bank operates as the credit risk taker in some shared capacity with the fund.

Advantage: The primary value of this is that the bank's, in theory, already have the management capacity to guide the lending process and the fund is used only to provide the required liquidity and to lower to cost of funds to targeted borrowers or projects. By sharing risk and sharing administration, the fund can be directed mostly towards projects rather than internal costs.

Disadvantage: Clearly if the bank system is ineffective, then this fund is not likely to be used properly. There is also the problem of having a blended mission for the funds. Most fund managers encounter difficulties with banks wanting to label a

project in order to access the funds when a loan may not meet the fund criteria. This tension can lead to problems.

Parallel funding body. Under this scenario, the fund is established as a separate non-bank financial institution (NBFI) with its own management, board of directors, charter, etc. It is responsible for its own credit analysis and its own risk assessment. The Fund may act in consort with Banks, but its decision-making is independent.

Advantage: Clarity of mission and independence of operation are the clearest advantages. There is also the issue of accountability and transparency for the funders.

Disadvantages: Higher administrative costs and greater project risks top this list. In addition, there is little potential for the funding mechanism to spread within the banking system unless they are involved. This limits concept sustainability.

Loan Guarantee: Under this scenario, the fund acts as a guarantor to the banks of the loans made to target projects or customers. Banks take their risk cues from the amount of the guarantee and modify their lending practices accordingly. This could play out as lower collateral requirements, reduced risk premiums or longer loan terms among others. The loan guarantees can be in the form of a temporary guarantee (one year of debt service) or in the form of a limited recourse in case of default (50 percent of principle plus interest). It can also be targeted to specific or general risks, as needed (poor energy performance, ESCO risk, etc).

Advantage: The banks use their own liquidity and the fund sets aside a reserve amount equal to the perceived risk of default. There may be a separate review process which allows oversight. This also allows, depending on set up, for more rapid recycling of loan funds.

Disadvantage: Less control over lending process as fund is still beholden to banks for loan processing and handling. Also there is the issue of risk pricing and risk sharing assessment. This applies across the board so it is not specific to this modality.

Conclusions:

Several of the conclusions have been addressed already, but we will recap here.

- Efficiency projects must be able to service loans within a reasonable period. Projects with long paybacks are not likely to generate either bank interest or support fund sustainability.
- The fund should not be used to support a poorly functioning banking system or get caught up in banking reform and operation issues. It cannot treat a sick system, only provide incentives for specific lending.
- The fund must operate within the legal, financial, business markets as they exist. Projects must also operate within the confines of the market as they are. Loans and projects which do not adequately assess risk of non-performance or assume legal support that does not exist will not be sustainable.

NOTES FROM BREAKOUT GROUP 3

Subject:
Revolving fund components for funding municipal streetlighting and/or water pumping efficiency upgrade

Present:
Arman Vatyan (facilitator), Vahe Melikyan, Levon Kocharyan, Sahak Minasyan, Artashes Petrosyan, Karen Galstyan, Mayis Vanoyan, Artashes Martirosyan, Mary Worzala

There was no representative from the water pumping area, so the discussion was concentrated on the streetlighting efficiency only.

It was decided to split the discussion into two phases: one with the operation of the fund with state owned Yerevan streetlighting company and other state companies, and the second phase with the involvement of private companies in the projects (e.g. cafes, restaurants, plants, etc.)

Mr. Karen Galstyan indicated some figures on current situation in the steetlighting area. There are 301 km of streets which used to be covered by the street lamps. He was not quite sure, but about 200 km from 301 is currently covered. The budget for street lighting for current year was established at about AMD 160 million, including AMD 60 million for admin and maintenance expenses and another 100 million for electricity expenses. These figures include VAT.

The majority of lamps currently in use on streets are mercury lamps. At present the company considering purchase new sodium lamps from “Grand Sun” company. They would allow saving about 16-17% of current electricity. A sample batch was installed on the fixtures and in the testing stage.

According to the standards (applied during the former Soviet Union period) AMD 232 million will be required to cover 290km of streets with light.

Mr. Karen suggested accepting this standard since the current streetlighting is not standardised, meaning that some lamps are lit and some others are not at present. For example, currently their company is lighting the streets for 5-6 hours daily.

Then the group started to consider the developed model. Since the figures and new light fixtures and lamps presented therein were considered as not much relevant to the current conditions, it was decided not to go too much into details but try to understand how the mechanism of fund could work and the opportunities presented therein.

During the discussion, it was mentioned that the labor costs indicated in the model, for example, are not realistic and considered high. Instead of USD 35, the installation would cost about USD 5 per fixture and lamp. (Note: the cost of $35/pole that is in the proposal that was being used for the model includes putting up a new pole, fixture and lamp. The cost of $5 refers just to changing the lamp).

During the consideration of the model, Mr Artashes Martirossyan (Inekobank) requested to provide with realistic figures on lending and the general approach of banks to finance this specific case. As he mentioned, the Armenian banks would hardly finance Yerevan Streetlighting State Company in order to receive the loan because there is an issue of who will guarantee repayment. Moreover in the banking sector there is a requirement to finance one individual client no more than 5% of total capital. In that case, it would be very complicated, since all the state enterprises are considered to be as one borrower, i.e. state, and it does not matter if it is a school, plant, or any other state owned company.

As a result of discussion, Mr Artashes Martirossyan stressed that banks will be much more willing to finance Escos rather than a state company. On the point about amount and percentage of investment, he agreed that it is not purposeful from the fund to guarantee 100% of the loan and he indicated that 70-80% guarantee of financing could be acceptable to consider the finance of Escos. He also mentioned that banks have no problems with amounts and can finance reasonably large amounts if the project is feasible and realisable.

On interest rates, he commented that in the near future it is highly probable that their rate would be about 20% p.a. But the timing of finance would hardly be more than 2 years.

Then the discussion was held on the participation of Escos and mechanism of their involvement. It appeared that they could not just install the lamps and fixtures and only for this reason take the responsibility for the loan of the bank. But they agreed that the loan could be received directly by Escos, and they in their turn would buy and install the fixtures and lamps on the street.

For Escos, it was agreed that they should also participate and take responsibility for maintenance of the replaced lamps. So that if they receive a loan and replace all the lamps on some specific streets, they could also maintain the street lighting during some period of time (say 5-7 years) then sell it to the municipality or by retender to other Escos.

In this case, it was finally agreed that the role of State lighting company could be eliminated. Moreover, Mr Karen mentioned that their company is willing and is going to be privatised once it makes a profit. So the municipality could also consider this former state company as Esco and it could participate to tenders.

All the above group discussion was based on the point that the municipality would agree to allocate some proportion from its 160 million or any other amount which is going to be directed to street lighting to an Esco for provision of this service by tender. The participants agreed that if the municipality signs a contract say on allocation of 2-3 streets to an Esco for 20 million AMD, it will have to pay otherwise the penalties will be placed on municipality. So the current situation of 60% payment of state budget amount will be resolved by this contractual mechanism.

Mr Karen also mentioned that there are some private companies which sign a contract with their company and are willing to participate in the financing of street lighting projects. Although he also mentioned that they would not be ready to take a credit from the bank and finance these projects.

The participation of private companies in this process is considered to be similar to an Esco. These were not much analysed in the detail since no representative from such companies which are willing to finance their premises/areas was in the group.

The revolving fund role was considered to facilitate the involvement of the banks in the process by providing a guarantee, and financing some portion of the project so that the interest rate decreases. There was not much detail on the real outputs from this structure and exact figures which would be acceptable by bank and Escos since no specific calculations were done.

Mr Karen promised to discuss the efficiency projects with their engineers and come back with specific calculations of efficiency and indicate what will be the duration, amount and terms of the loan which will be feasible to invest in the area.

NOTES FROM BREAKOUT GROUP 4

Subject:
Revolving fund components for funding school / hospital heating system upgrade with weatherization

Present:
Samvel Bareyan (facilitator), Ashot Gomptsyan, Liana Ghavalyan, Mara Abrahamyan, Leily Yeghoyan, Varduhi Kheboyan, Varduhi Katinyan, Hamlet Ghazaryan, Marina Kostanyan, Arthur Lalayan

- As a general comment it should be noted that there were no bank representatives in this Breakout group.
- The representatives of Schools and Hospitals stressed during the discussion that the situation with the efficiency of the heating system is critically low, and therefore the improvements are highly demanded. However, the financial resources are very scarce and should be thoroughly studied.

Sources of finance

- There are two types of budgeting for the heating systems for schools. a) Boarding and special schools are being reimbursed for their heating expenses, however the there is a limit to the calculation of the heating expenditure using a formula which is based on the use of 0.6 kWt hot-plate/heaters for every 10sq.m. of usable area; b) Secondary schools receive from the state AMD 24,348 per pupil per annum plus AMD 2.6 Million fixed for all their expenses. About 10% of annual budget on average is allocated to heating and lighting. Lighting makes only up to 5% of the previous.
- It is the participants' opinion that the constancy of state budget for schools is quite uncertain. Moreover, it was reported by that the number of pupil in the schools is constantly decreasing by around 7,000 per annum, meaning that the budget allocation to schools will decrease.
- On the other hand the sources of revenue for the hospitals are diverse, which come from collections from the their customers and state payments/subsidy for serving their customers.
- The participants think that it is very unlikely that the banks will agree to finance even a portion of energy efficiency projects for the state schools. The reason being that schools do not have any security to pledge. The building are owned by the state and they cannot be pledged. Other types of security are also very doubtful. This situation with the hospitals is quite different since hospitals are separate legal entities and these entities own their buildings.
- It was mentioned that the municipality will have to foresee an upcoming expenditure for renovation of old electric heaters. However, this is being discussed. Anyway, there should be some expenditure for replacement of unusable heaters, the financing for which if not approved by the Municipality should be raised from the parents of pupils. In addition, it was noted the up to 5% of total project cost may be rased from the parents of pupils.

Financial model testing

- There is little research, measurement or study information available about actual energy efficiency of building facilities of schools. However, the municipality is willing to make a study and provide the names of the schools in which energy efficiency may be increased with lower expenditures. After inputting the data of pilot project of a sample school N 132 and 21, the total project cost (iterations

included just boiler costs, just weatherisation costs, inclusion and exclusion of the gas pipeline cost and combination of these components) and expected benefits, savings, revenues into the financial model. The model showed that the we cannot expect to break even earlier than during the first 10-20 years. The test of different combinations of financing by ESCO's, client's own resources and Fund revealed that in order for the Fund to "revolve" (cover its costs, default risk) high portion of initial project cost (up to 20%) should be obtained from the client, - the school itself. It is necessary to obtain guarantees from the state on the timely payment of the amounts due and the constancy and regularity of payments for heating to schools. It should be expected that large portion of project costs should come from

- Little reliance can be put on the funding from banks. Even small portion (20%) of total project cost may be repaid only in 6-8 years. The cost of capital from the banks (20% p.a. vs 10% p.a.) is higher than expected returns from project savings, in addition, the maximum length of loan term is quite short (4 years). Insertion of a guarantee fund scheme in the schools model does not significantly improve the financial performance, making it unlikely that the banks will be highly interested in financing such projects.

APPENDIX 7

FINANCIAL MODELS TO BE CONSIDERED

The purpose of this document is to provide a summary of the arithmetical arguments behind different loan fund models. Models are compared on the basis of the potential impact the fund and on the ability of the fund to revolve. The impact of the fund is expressed in terms of the threshold value of simple payback period (SPBP) below which a project becomes viable. The higher the threshold SPBP is, the greater the impact of the fund.

NOTES:

1. Years to revolve = number of years for the undiscounted repayments to the fund (net of operating costs and offsetting project failures) to exceed the size of the original investment by the fund
2. All the following models assume no cost-sharing – i.e. the project is financed purely by a combination of a local bank loan plus investment from the Fund. If some cost-share is contributed by project players who expect no *direct* return from the project (for example, a householder might be willing to share the costs purely in the expectation that the project will result in the value of their apartment increasing) then this is represented in the analysis below as a shortening of the simple payback period (SPBP). However, if cost-sharing participants expect a non-zero financial rate of return, this effectively becomes an equity investment, and must be dealt with as under Model 5 below.
3. Each of the models below is evaluated under two different scenarios:

   (a) Assuming the Fund remains at $1 million, its administrative costs are likely to be at least 15%, and project failure rates are likely to be about 1% per year (i.e. 10% over the 10-year lifetime of the projects). The Fund therefore needs to earn a **16% rate of return** to sustain itself.

   (b) Assuming the Fund is sufficiently large that its annual administrative costs are 5%, and project failure rates remain at 1% per year, the Fund therefore needs to earn a **6% rate of return** to sustain itself.
4. Assuming current conditions where banks loans are available at 20% over 2 years, any project with a SPBP < 1.53 years would be able to service a pure bank loan, with no involvement of the Fund.

Model 1 – blending money from the Fund with a commercial bank loan to buy down the interest rate

This model assumes that the *period* of the loan is not affected by the money from the Fund (i.e. the Fund lends over the same period as the local bank).

(a) Fund rate of return = 16%

If the Fund needs to earn a rate of return of 16%, and provides half of the project investment cost, the overall interest rate to the project is therefore 18%. This would have the effect of lowering the 'hurdle' to permit projects with a SPBP < 1.57 years.

(b) Fund rate of return = 6%

If the Fund needs to earn a rate of return of 6%, and provides half of the investment cost of the project, the overall interest rate seen by the project is therefore 13%. Projects with a SPBP < 1.67 years now become viable. If the Fund contributes 70%

of the project costs, the cut-off SPBP extends to 1.73 years. Note, however, that if the Fund provides too high a proportion of the investment costs of each project, the number of projects that can be supported is constrained, and there is also a danger that the Fund will be perceived as competing with the local banks. In both of the above cases, the time taken for the Fund to revolve is less than 2 years.

Model 2 – using the Fund to provide a very high level of risk guarantee

The evidence from the Fund Design Workshop is that banks may be willing to lend over 3 years at 18% if there was a very strong guarantee provided by the Fund. This compares with loans at 20% over 18 months to 2 years at present. Under these circumstances, projects would need to have SPBP < 2.17 years to be able to service their debt. In practice, however, the fund would need to charge a fee to cover its administrative costs and the percentage of projects that fail. These costs would presumably be passed on to the project in the interest rate, so the actual interest rate charged to the project would therefore be unlikely to be as low as 18%.

The Fund would need to provide full 100% coverage initially, but the guarantee would only need to be in place for the three years that the bank loan is outstanding, and the level of the guarantee for each project could be reduced as the principal is paid off. Under this model, therefore, the fund effectively revolves in three years.

Model 3 – pure on-lending by the local banks, with loan terms determined by the Fund

Under this model, the local bank merely administers the money from the Fund, which lends the full cost of the project at terms determined by the Fund management. The period over which the Fund lends is a compromise between being long enough for a significant number of projects to clear the 'hurdle', but short enough that the Fund revolves.

(a) Fund rate of return = 16%

If the loan period is 3 years, projects need to have SPBP < 2.24 years and the Fund revolves in about 2.8 years.

If the loan period is 10 years, projects need to have SPBP < 4.83 years and the Fund revolves in 5.8 years.

(b) Fund rate of return = 6%

If the loan period is 3 years, projects need to have SPBP < 2.67 years and the Fund revolves in about 2.8 years.

If the loan period is 10 years, projects need to have SPBP < 7.36 years and the Fund revolves in about 7.9 years.

Model 4 – the Fund provides loans with a grace period equal to the period of the commercial loan

Under this model, the local bank is assumed to lend at 20% over 2 years, and the Fund provides a loan with a grace period of 2 years. Because it offers a grace period, the Fund needs to charge an *actual* rate of interest that is substantially higher than the required rate of return. The actual rate charged depends on the loan period.

(a) Fund rate of return = 16%

If the Fund requires an *effective* rate of return of 16%, and is offering a grace period of 2 years, the *actual* interest rate it has to charge is 27% for a loan period of 7 years,

up to 36% for a loan period of 3 years. The table below shows the required project SPBP for different combinations of Fund contribution and Fund loan period.

		Period of loan from Fund (in addition to grace period)		
		3	5	7
Interest rate that Fund has to charge in order to earn an effective rate of return of 16%		36%	30%	27%
Share of project cost coming from Fund	20%	1.91	1.91	1.91
	40%	2.55	2.55	2.55
	60%	2.78	3.82	3.82
	80%	2.09	3.04	3.76

By providing finance over 5 to 7 years (plus the 2 year grace period) and by achieving the optimum apportioning of project costs between bank and Fund, it is possible for projects with a SPBP as long as 3.82 years to be viable under this model. However, the grace period has the effect of lengthening the time it takes the Fund to revolve. Where the loan from the Fund is provided over 7 years, the time taken for the Fund to revolve is approximately 5.5 years.

(b) Fund rate of return = 6%

If the Fund requires an *effective* rate of return of 6%, and is offering a grace period of 2 years, the *actual* interest rate it has to charge is 9% for a loan period of 7 years, up to 13% for a loan period of 3 years. The table below shows the required project SPBP for different combinations of Fund contribution and Fund loan period.

		Period of loan from Fund (in addition to grace period)		
		3	5	7
Interest rate that Fund has to charge in order to earn an effective rate of return of 6%		13%	10%	9%
Share of project cost coming from Fund	20%	1.91	1.91	1.91
	40%	2.55	2.55	2.55
	60%	3.82	3.82	3.82
	80%	2.97	4.68	6.21

By providing finance over 7 years (plus the 2 year grace period) and by achieving the optimum apportioning of project costs between bank and Fund, it is possible for projects with a SPBP as long as 6.21 years to be viable under this model. However, for a loan period of 7 years, the time taken for the Fund to revolve is approximately 8 years under this model.

Model 5 – equity investment by the Fund (or by other players) for the duration of the project, combined with a local bank loan

Under this scenario, the Fund's investment in the project is more equity-like in character. The return to the Fund is variable, falling to low levels (or even to zero) while the commercial loan is being paid off, but rising to high levels thereafter. The Fund carries virtually all the risk associated with the ability of the project to generate

an adequate cash flow. Because of the additional security resulting from the Fund's willingness to carry most of the risk, it is assumed under this scenario that the local banks would be willing to lend at 18% over 3 years, as they have indicated that they would do in the presence of a guarantee.

(a) Fund rate of return = 16%

The table below shows the relationship between equity contribution and the threshold SPBP above which projects are viable.

Equity contribution	Required SPBP	Years to revolve
20%	4.6	6.3
40%	4.7	6.2
60%	4.7	6.1
80%	4.8	5.9

Note that if equity is contributed by other players who are satisfied with a rate of return of less than 16%, the required SPBP will be correspondingly longer. Conversely, if other equity investors require greater than 16% rate of return, this will shorten the threshold SPBP.

(b) Fund rate of return = 6%

The table below shows the relationship between equity contribution and threshold SPBP, assuming the Fund needs to earn a rate of return of 6%, and assuming a bank loan of 18% over 3 years.

Equity contribution	Required SPBP	Years to revolve
20%	6.0	8.3
40%	6.3	8.1
60%	6.6	8.0
80%	7.0	7.8

Note that if equity is contributed by other players who are satisfied with a rate of return of less than 6%, the required SPBP will be correspondingly longer. Conversely, if other equity investors require greater than 6% rate of return, this will shorten the threshold SPBP.

CONCLUSIONS

Models 1 & 2 discussed above have relatively little impact on the number of projects that would be viable. At best, these models would only make viable those projects which have a SPBP of approximately 2 years or less. This emphasises the fact that, in order to make a significant number of currently untenable projects viable, it is more important to focus on providing longer-term finance, rather than on lowering interest rates.

Model 4 above is also felt to be weak, because of the long time it takes the Fund to revolve relative to the impact it has on threshold SPBP. Unless finance is provided over seven years (in addition to the assumed two-year grace period) and the Fund covers a very high fraction of the project cost, the impact of this model on lengthening the threshold SPBP is small. However, the time taken for the Fund to revolve is 5.5 years for an effective rate of return of 16%, up to 8 years for an effective rate of return of 6%.

The most effective models appear to be either on-lending over a long period through local banks (Model 3), or providing a high proportion of the project costs in the form of an equity investment (Model 5). Both of these models imply the creation of a non-bank financial institution for the purpose of managing the Fund.

While on-lending with a very long loan period has the greatest impact in terms of lengthening the threshold SPBP, the local bank's role in this model is reduced to one of simply administering the money provided by the Fund. Conversely, while providing an equity investment from the Fund has slightly less impact on the threshold SPBP, it has two significant advantages. Firstly, for projects where the SPBP is short compared to the threshold, it is possible for the Fund to revolve very rapidly, so making resources available to invest in further projects. Secondly, it is likely to have a more positive stimulatory effect on the local banks, as their involvement in this model takes the form of providing loans under normal commercial conditions, rather than merely administering the Fund's resources.

A clear conclusion that can be drawn is the necessity to reduce the percentage operating costs of the Fund by enlarging it. In order to sustain itself, the Fund needs to earn a rate of return large enough to cover its operating costs as well as to offset the costs of projects that fail. With the Fund at its current size, the operating costs are likely to be in the region of 15%, and the rate of return it would need to earn is so high that the Fund is able to have relatively little impact. At best, the Fund would extend the range of viable projects to include those with a SPBP of up to 4.8 years. However, if the Fund were increased in size such that its operating costs were brought down to around 5%, projects with a SPBP as long as 7.3 years could be made to be viable.